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VARIABLE VOLUME BEVERAGE CONTAINER

SPECIFICATION

FIELD OF THE INVENTION

My present invention relates to a container for a packaging of a soft drink with adjustability of the internal volume of the container and, more particularly, to a variable volume beverage container which can minimize gas loss from the beverage over a period of consumption, i.e. from initial imbibing of the beverage to the end of its consumption. The soft drink container of the invention, which also can be used with any beverage which emits gas, is designed to retain the gas in the beverage more effectively than heretofore.

BACKGROUND OF THE INVENTION

In general whenever a beverage charged with gas, for example, a soft drink, a sparkling beverage, beer or even carbonated water, is bottled in a container, once that container is opened to allow for consumption, there is a loss of gas and hence a loss or flavor or the sparkling sensation which results when the charge of the beverage is reduced.

The containers used heretofore, whether a glass bottle, can or plastic container, usually had a relatively large volume above the liquid into which gas could escape from the beverage in spite of the fact that the container could be completely sealed.

This applies to bottles, metal packaging and polyethyleneterephthalate bottles used because these containers can be recycled, easily chilled after filling and opening and frequently can be resealed.

The loss of fizz or gas from the liquid into the free space remaining above the beverage once the container has been reclosed and after use amounts to a significant deterioration in the quality of the beverage.

OBJECTS OF THE INVENTION

It is the principal object of the present invention to provide an improved container, especially for beverages containing gas or charged with gas, which is able to retain a high quality for a longer period than earlier containers even after opening and reclosing.

Another object of the invention is to prevent the loss of gas form a soft drink or other beverage after partial consumption of the beverage from a container in which the soft drink can be initially packaged or into which the beverage can be transferred.

Yet another object is to provide an improved beverage container whereby the drawbacks described above can be equally avoided.

SUMMARY OF THE INVENTION

I have now found that the drawbacks of conventional containers with respect to soft drinks and other beverages containing gas under pressure can be eliminated by providing a variable volume beverage container in which the interior volume is reduced as the beverage is consumed to maintain a minimum gas space above the beverage at all times.

More particularly, a variable volume beverage container according to the invention comprises:

a vertically elongated upwardly open base having a cylindrical wall formed at least along an inner surface with formations distributed over at least a major part of a height of the wall;

a downwardly open upper part having a wall formed at least externally with formations mating with the formations of the base and enabling variable height insertion of the upper part in the base for varying an internal volume of the container as defined by the base and the upper part, the upper part forming a seal with the base preventing escape of gas from the container;

a mouth on the upper part affording access to an interior of the container; and

a removable cap on the mouth.

The container of the present invention can have relatively rigid base and upper parts molded from synthetic resin and provided with mating screw threads as the formations

mentioned, the base and upper part being preferably made by injection molding, twirl or rotational casting or blow molding. If desired the base or upper part can also be made of metal. When the base and upper part are made of metal they are preferably made from polyvinyl chloride, polypropylene, polyethylene, polyamide (nylon) or polyester, e.g. polyethyleneterephthalate.

According to a feature of the invention the cap is a screw cap threaded onto a neck of the container surrounding the mouth and either aligned along the axes of the cylindrical walls or offset from those axes. The wall of the base can be formed on an upper end with a reinforcing ring and a sealing ring, for example, an O-ring can be received between the upper end of the wall of the base and the upper part which fits into the lower part or base. The upper part may have a head along its exterior which can seat in or against the upper end of the base.

As will be apparent, as beverage is dispensed form the container, the upper part is screwed down into the lower part to reduce the air volume above the liquid to a minimum, e.g. before the container is sealed by the cap.

BRIEF DESCRIPTION OF THE DRAWING

The above and other objects, features, and advantages will become more readily apparent from the following description, reference being made to the accompanying drawing in which:

FIG. 1 is a perspective exploded view of a container in accordance with a first embodiment and in which the base can be injection molded plastic, rotationally cast metal or a like material while the upper part is a blown plastic;

FIG. 2 is a side elevational view of the container of FIG. 1, partially broken away;

FIG. 3 is a side elevational view of the container, partly broken away but showing the upper part fitted into the base as the container is filled;

FIG. 4 is a view similar to the container of FIG. 3 but with the upper part practically fully received in the base as the interior volume has been reduced.

FIG. 5 shows the container with the parts thereof essentially in the position shown in FIG. 3 but with the cap in place, sealing the contents of the container at the higher internal volume;

FIG. 6 is a perspective exploded view of another embodiment in which the thread pattern on the interior of the base also appears on the exterior thereof, the container otherwise being similar to that shown in FIG. 1;

FIG. 7 is a side elevational view of the container of FIG. 6 in its exploded form and partly broken away;

FIG. 8 shows the container of FIGS. 6 and 7 but with the upper part nested in the lower part and the cap sealed.

FIG. 9 is an exploded view similar to FIGS. 1 and 6 of still a third embodiment in which a reinforcing ring is provided around the mouth of the base to increase the sealing effect created by the internal pressure;

FIG. 10 is a side elevational view in exploded form and partly broken away corresponding to FIG. 9;

FIG. 11 shows the parts with the upper part nested in the lower part of the embodiment of FIGS. 9 and 10;

FIG. 12 is a perspective exploded view of another embodiment of the invention in which the threads have rounded cross sections and wherein the base is a blown plastic while the upper part is an injection molded synthetic resin or rotationally cast metal;

FIG. 13 is a side elevational view of the embodiment of FIG. 12 in its exploded form;

FIG. 14 is a cross sectional view showing the upper part nested in the lower part; and

FIG. 15 is a side elevational view the upper part of the fourth embodiment fully inserted in the base.

SPECIFIC DESCRIPTION

The soft drink container shown in FIGS. 1 - 5 is capable of adjusting the internal volume 1 (FIG. 3) when the container is filled from another container 21 or is initially filled with a beverage at a packaging plant.

The container, shown in its exploded form in FIG. 1 is a bottle 2 comprised of a base 3 and an upper part 5 adapted to fit in the base 3. The base 3 is a concave cylindrical structure with a rounded bottom 22 and a vertical wall 23 which is internally formed with a female screwthread 4 terminating at a mouth 24 of the base and extending practically to the bottom 22 thereof. The exterior of the base 3 in the embodiment of FIGS. 1 - 6 can be smooth. The base can be an injection molded plastic or a rotationally cast metal and has substantial rigidity.

The upper part 5, by contrast, can be blow molded, e.g. of the same material as the base 3 and is a downwardly open member with a wall 25 which is cylindrical like the wall 23 and, when the upper part 5 is inserted into the base, is coaxial therewith. To that extent the upper part 5 is a concave cylindrical member. The external thread 6 threadedly mates with the thread 4 so that the upper part can be screwed down into the base.

The external thread 6 extends practically the full axial length of the wall 25 and terminates at a funnel shaped portion 26 which, in turn, is provided with a neck 7 surrounding

the mouth or orifice 27. The neck 7 has an external thread 8 which mates with an internal thread of a lid or cap 9.

A pair of radial webs or flaps 10 are formed on the funnel shaped member 26 for engagement by the fingers of the user to allow the upper part 5 to be screwed down into the base 3 and form a seal between the threads of the base and the upper part. The threads can have a suitable finish to allow the sealing action without the escape of gas from the container when the cap 9 is tightened onto the neck. The threads 4 and 6 may be sufficiently massive and have a finish enabling them to seal against one another with a sealing effect which increases with the gas pressure within the container. As can be seen from FIG. 3, the container can be filled from a disposable bottle 21 as purchased from a store or the like after the user has consumed part of the contents of the disposable bottle. The beverage 28 is introduced into the container and the upper part 5 is screwed into the base 3 (FIG. 4) until there is little space 29 above the level 30 of the beverage in the container. The external surface 31 of the base may have an appropriate label or can receive stickers or the like supplied by a beverage company as a gift or premium offer. As additional liquid is withdrawn from the container, the upper part can be screwed down further into the base.

In the embodiment of FIGS. 6 - 8, the threads 4 on the interior of the base are reflected as an external pattern of threads 32 on the exterior surface of the base. Otherwise the

embodiment of FIGS. 6 - 8 is similar to the embodiment of FIG. 1. The base can here be injection molded or blow molded of a synthetic resin such as polyvinyl chloride, polypropylene, polyethylene, polyamide or polyethyleneterephthalate. If one of the two parts is injection molded, the other may be blow molded.

In a third embodiment shown in FIGS. 9 - 11, the base 3 is formed at the upper edge of its cylindrical wall 33 with a reinforcing ring 11 which assists in maintaining the seal. Here the base 3 may be below molded while the upper part 5 can be more rigid.

A fourth embodiment has been shown in FIGS. 12 - 15 and comprises a base 13 with rounded-section threads 35 and a reinforcing ring 17 at the upper end of the cylindrical wall 36 of the base.

While the thread 35 extends the full height of the wall 36, the external thread 16 on the cylindrical wall 37 of the upper part 12 extends along over a short axial extent of the wall 37 and has mating rounded threads. Nevertheless a seal is provided between the threads 16 and the threads 35 of the base.

A bead 38 serves as a stop when the upper part 12 is fully inserted into the base 13 (compare FIGS. 14 and 15) and can assist in pressing an O-ring or like sealing ring 18 into a groove 39 surrounded by the ring 17. The mouth 14 of the neck 40 can be closed by a cap 15 engaging the screwthread 41 surrounding the neck 40 (compare FIGS. 12 and 14). The O-ring 18

or any similar seal is effective when gas pressure develops within the container to increase the sealing effect.